國立嘉義大學九十五學年度

土木與水資源工程學系碩士班招生考試試題

科目：工程力學

（如條件不足，請自行假設。可使用工程計算機）

1. For the straight beam shown in Fig-1, determine
   (a) equations for the slope and deflection, at an arbitrary point along the beam, (6%)
   (b) the location of the maximum deflection, and (6%)
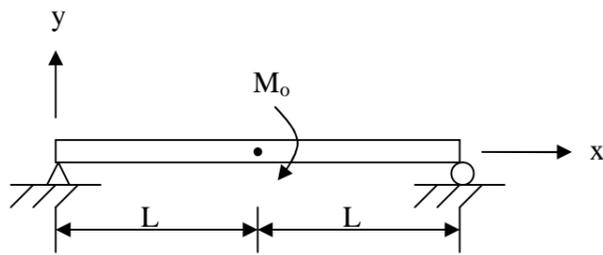   (c) the magnitude of the maximum deflection. (6%)

Fig-1

2. A beam of flexural rigidity EI is loaded with a concentrated force P and supported on two springs K_1 and K_2 as shown in Fig-2. Find the deflection under the load applied. (20%)
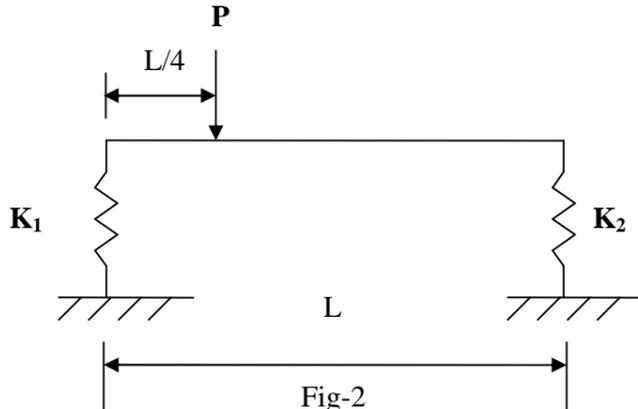

Fig-2

3. An element in plane stress is subjected to the stresses σ_x=15 psi, σ_y=5psi , and τ_{xy} =12 psi, as shown in Fig-3.
   (a) Determine the stresses on the element inclined at an angle θ=45°. (8%)
   (b) Determine the principal stresses. (7%)
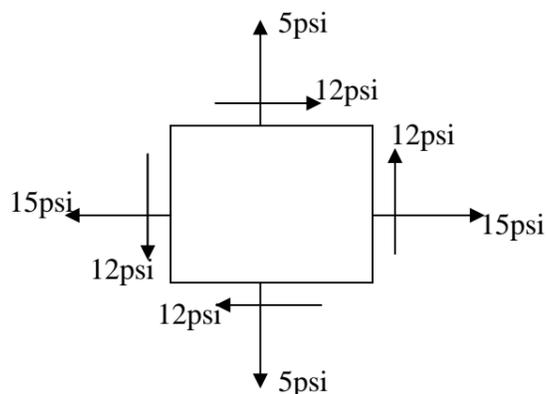   (c) Determine the maximum shear stresses. (7%)

Fig-3

4. An I-beam is subjected to a bending moment 50000 N-m and a vertical shear force 10000 N, as shown in Fig-4. The cross section has width b=10cm, height h=16cm, and thickness t=2cm, determine the maximum tensile stress (10%) and the maximum shear stress in the beam. (10%)

Fig- 4

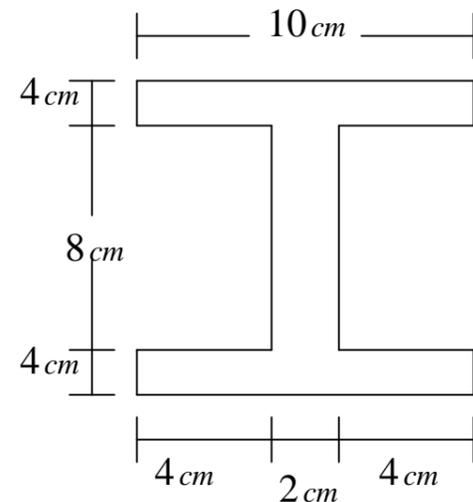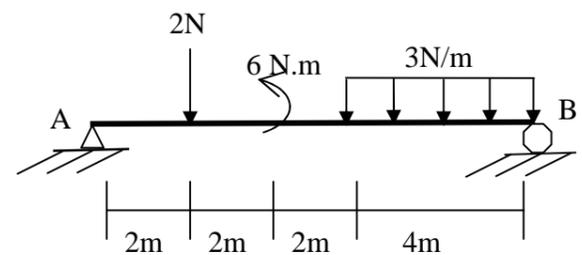5. Draw the shear force and bending moment diagrams of Fig-5 . (20%)

Fig- 5